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Bulletin of the
Society for the Promotion of Engineering Education

VOL. XI LANCASTER, PA., SEPTEMBER, 1920 NO. 1

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BULLETIN

OF THE

Society for the Promotion of Engineering Education

Published under the supervision of the Publication Committee:

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VOL. XI LANCASTER, PA., SEPTEMBER, 1920 No. 1

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FOREWORD.

BY MORTIMER E. COOLEY,

President of the Society.

No one who has looked through the *Proceedings* can fail to be impressed with the amount of work accomplished by the Society for the Promotion of Engineering Education. Pro-

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fessor Chatburn's paper in the 1919 *Proceedings* affords a general survey of the field of the Society's activities. In his classification of published papers 13 per cent. deal with "engineering education in the ideal, general policy, education *vs.* culture, electives, etc.," 21 per cent. with "instruction in general, management, research, thesis, etc."; and 36 per cent. with "teaching in special departments, methods and details." The other 30 per cent. are divided among seven subjects, 9 per cent. being "miscellaneous."

The 28 volumes (including the index) of the *Proceedings* contain 10,000 pages. While a vast amount of thought and labor has been given to the preparation of papers, and they have been subjected, when presented, to virile discussion, and while no doubt they have resulted in many things being done by individuals to improve their curricula and their teaching, very little appears to have been done towards cooperation between engineering colleges. It seems to me that after 28 years of such work our engineering schools should show more of united effort. We have, to be sure, got together on a number of things, or practically so. We have substantially the same entrance requirements, and about the same amount of work is required for graduation. And the fact that students can, and do, transfer from one school to another without much loss of credit indicates a fair agreement on sequence of studies and thoroughness. But there are many other things that could be done of even greater importance as I see them.

We all recognize and admit that our curricula are too crowded and that more time would be desirable. Many of us are convinced that our curricula are too technical, that engineers should be more liberally educated. We find in our several laboratories much duplication of equipment for research, and that we are working on the same problems; not only that, but that we are solving again problems already well solved. Our efforts are not coördinated. In short, each school is working out its own problems as it sees the light and striving to excell all along the line. There is a spirit of competition. We go about from school to school to see what

is being done and try to imitate or do something better. While this is for many of the things highly laudable, one gets the impression that there is more or less of the commercial spirit in the competition. Hardly that, perhaps, but something akin to it.

The criticism which I think may be applied to all present day education without protest, is, that it has for its object the preparation of our youth to earn more dollars. There is no longer education for education's sake. Our education lacks thoroughness. There is not enough drill on fundamentals. The attitude of the student is shown by the dispatch with which he sells his textbooks as soon as a course is finished. A course is something to be got off, to receive credit for which will count towards graduation. That accomplished, why bother further? This is becoming, or has become, a national trait. The fact that our nation is largely commercial is probably the reason. Not one of us will admit or contend that it is good for the nation. Then how may the tendency be corrected?

"As the twig is bent so is the tree inclined."

Were correction desired, or considered necessary, a very long step could be taken towards it in our schools. But considerable changes would be necessary—not only in our curricula but in the teacher's attitude as well. It would seem a hopeless task for a school here and there to do something different, but united a great deal could be done. Then why not coöperate? The keynote of our last convention was coöperation. But it was coöperation between the schools and the manufacturers. Why not have another convention with the same key-word, but let it be coöperation between the schools—the engineering schools?

After twenty-eight years of good work, much of which has dealt with details, and been potential in character, is not the time ripe for getting together? A year of thought and effort given to the preparation of papers and plans having for their object the conversion of our store of potential ideas into something kinetic, would be well spent. It should be recognized

at once that such a program would likely cause our Society pot to boil violently, even boil over. But that need not disturb us. We know that the boiling process is often necessary in the preparation of solutions, and that from the solution comes the precipitate, the thing we are after.

The more I think of it, the more I am convinced that our Society could not have a better purpose than to try to bring about at this time a greater degree of coöperation between the engineering schools. The first step would be to get together to discuss mutual problems and become better acquainted. The associations of University Presidents, of University Secretaries and of Literary Deans naturally suggest an association of the administrative officers of Engineering Schools. The Society could be sponsor for this movement. Its conventions could serve for the more general discussions and its publications for publicity and record.

I said something of this sort at the convention. I am glad to say it again, particularly as a foreword. No one realizes more than I how big a task is involved. Many divergent forces would need to be directed and controlled. But our business as engineers requires us to direct and control forces. If we only have the will, I am sure we can bring about a much greater degree of coöperation between engineering schools.

COÖPERATION BETWEEN THE PREPARATORY SCHOOLS, THE ENGINEERING COLLEGES AND INDUSTRIES AS VIEWED FROM THE STANDPOINT OF THE EDUCATOR.

BY ARTHUR M. GREENE, JR.

The engineering college stands between the preparatory school and the industries, receiving from one and giving its product to the other. The relation which it should bear to each, the coöperation which it should offer and expect, and the unity of development which the three should manifest are the subjects of this discussion.

In developing these thoughts of coöperation it is necessary that certain admitted premises be stated or the conclusions will be invalid. Certain fundamentals are accepted by some as the basis for the plan of engineering education. There are two distinct views regarding the preparation for this training. Some believe that such colleges should be planned to take the product of our average high school or preparatory school and in a limited time produce men suitable for individual work in the industries. Some believe that the schools should demand preparation similar to that required by law and medicine and hence that an academic degree or two years of college work should be required for entrance to the school of engineering. The former is the belief of the greatest number of schools as indicated by their requirements for entrance. In this discussion the assumption is then made that the college is to accept graduates from the high school. The other premise which is assumed is that the colleges are training men who may enter any portion of the particular field of engineering which they have selected. The granting of these two conditions leads to the following developments.

The average high school or preparatory school! What is it doing? What can it do? What should it do?

The engineering school of which we will speak as the college, requires the same thing from the high school as that which industry demands from the college: graduates who shall be taught to reason about problems which are related to the studies they have taken, and studies which should be selected so that they may be utilized in the scheme of after development.

The high school should so select its subjects that the preparation may be equally of use to the pupil entering college or to the pupil entering commercial or industrial life. Many high school pupils do not know what they will do when their course is completed. Many alter their plans due to changed circumstances. In any case the fact remains that the pupil must think, must judge, must reason, must act in any field which he enters.

The plea is made that greater progress could be attained if a more complete drill could be given the pupils in the application of the fundamental high school studies so that these subjects become real to them and they may reason better from this training. Using a word from our last convention, "motivation" should be introduced to stir up interest but many original problems must be given to cause the pupil to do independent thinking. Studies should be made more real to the pupil and he should be trained in making decisions through reasoning based on this work.

Take for instance arithmetic: our trouble at Rensselaer has been that the freshman has failed to realize in the grades or high school what percentage is. When it is necessary for him to reduce constituents of a chemical compound to percentage he appears as ignorant as one who had never heard of percentage. In many cases he is like the man who said that he only made one per cent. when he bought something for one dollar and sold it for two. This seems to be a general condition and is probably due to the fact that teachers fail to

emphasize the real meaning of such things. In many cases this may be caused by failure of the teacher to realize this meaning. Without experience on the part of the teacher the subject can rarely be made real to the pupil.

The work in geometry is often such that the real value of this study is not understood. The force of the geometrical proof as a method of logic to be applied in other places is not made clear, the use of the proof in the solution of originals and the method of turning to the text for references in new problems seem to have been forgotten by the teacher. Rarely can engineers work out problems in railroad curves, or vector analysis, in valve diagrams or turbine design, in mechanism or descriptive geometry without the use of some of the theorems or constructions used in geometry. What is more important students can rarely pass a day in which they do not apply the mode of attack and reasoning gained by the study of geometry in the solution of some practical problem.

The work in algebra is important in teaching us the methods of literal calculation. To me, its importance is due to the fact that it furnishes us with tools with which to work. The methods used in the reduction of fractions, in factoring, in the study of the three series, in quadratic solutions, are all of value in the later work of college algebra and are to be applied in everyday practice in the solution of engineering problems. The great trouble again seems to be the lack of facility in handling the work done. Although the ground covered in the high school is not great thoroughness is lacking after the completion of the limited work.

The question of coöperation between the schools and the colleges in the matter of mathematics is one which resolves itself into a more thorough drill in the applications of arithmetic, geometry and algebra by those who appreciate and know the work dependent upon these. The failure to realize the meaning of the mathematical subjects studied appears to me to be the lack of the present day matriculates of our colleges.

The effect of this more complete training on the pupil who

does not go to college but who enters business life should be considered. This class represents the larger portion of the high school graduates. It is believed that this training prepares such persons for more successful careers. The statement of a problem to be proved, the collection of possible facts or theorems to be used, the selection of the correct facts for the proof, followed by the actual proof can be used in daily commercial or industrial life by the young graduate from the high school. Judgment and reasoning are the necessary steps in the ladder of success here as in engineering.

The work in English in the preparatory school as in the engineering college must be carried on with diligence and with constant drill. The coöperation hoped for here is merely that which should exist between institutions in which a subject begun in one is continued in the other. If the high school could inculcate the desire for good reading so that this habit were formed before the pupil came to the college broader work could be done with many of our men who at present are too narrow on completing the high school work. Spelling and penmanship should be taught more thoroughly with an ever-present drill.

The other language work of the schools is to aid in the study of English and to give the engineering student a working knowledge of some foreign language. That the language should be studied more completely can not be denied but the amount is questionable. In some engineering colleges foreign language is being omitted from the curriculum and required for entrance. This may be done but the science reading for which the foreign language is given in college can not be accomplished in the high school with much success because of the youth and inexperience of the pupils. The reading of foreign non-scientific literature can be carried on in the preparatory schools with success and such preparation will reduce the college work, but the engineering school should give scientific reading for all men even though this be limited in amount. The great need is to be able to scan a foreign journal for articles of interest and value.

In the sciences, the work of our engineering student indicates that a more thorough drill in the fundamentals is required in the preparatory school. The work shows that greater intensity rather than more extent is needed. The men with excellent science training in many of our high schools are more interested in the later developments of science than in the "hum drum" elements on which the science rests and in which the pupil needs thorough grounding. The teachings of these fundamentals is rather irksome to some but to make a success of high school training the subjects must be real, live things with which the pupil experiments and which are observed each day by him.

In some colleges the science entrance requirement is not a specific science and all of their courses in science begin with an elementary course. In this way a certain amount of time is lost for those students who repeat the elementary portion of the science which they have taken in school. If this work is well done, and in some schools it is, the engineering college could require physics or chemistry for entrance and begin these subjects at a more advanced place giving an elementary course in physics or chemistry for those who have not had one of them. To require one or the other subject might prevent a pupil from entering an engineering college if the required subjects were not taken and at the time of graduation from the high school circumstances had changed so that a college education were possible although before this time conditions were such that no such plan could have been made.

The work in history has little if any bearing on the actual work of engineering schools although it brings clearly to mind that industrial development is a result of many causes and that the invention of one device may set free a whole nest of possibilities. The steam engine made possible modern industrialism, the gas engine made possible the automobile and the airplane. This training in history gives the pupil a broader outlook on life. It fits him to know more about its development and its significance. History aids us in account-

ing for customs and methods of today when our complex life is analyzed.

The manual training arts, although of value to the pupil entering industrial or commercial life, are not necessary to the engineering student for entrance as this work in a more philosophical form is done in the college. Those entering the industries may use the high school manual work at once in shop or drafting-room, those in commercial life may utilize this training in their judgment of the work of others. For the engineering student, manual training only gives a more extended experience in such subjects, for in many cases advanced credit can not be given.

From the above it is seen that the curriculum of the high school is satisfactory in general, the great trouble being the absence of intensive drill and emphasis of the underlying principles of the subjects. This same criticism may be made against the college to some extent. The great need of today is to begin the inquisitive line of thought early and at the same time to make the subjects taught real, giving the student indelible pictures by repetition in proof and problem. The gaining of credits, although necessary, is not the important thing, the ability to reason, to judge, to act from the training is the main purpose.

The subject of entrance requirements to our engineering colleges is one which demands special mention. We must have coöperation here between the schools and the colleges. What should the entrance requirements be? This question is answered in many ways by different educators and different faculties. The more advanced the requirement for entrance the greater the amount of engineering specialties which can be given in our colleges. Are these specializations necessary? Is it not the function of the school to give fundamental training on which the specialization is to be developed in post-graduate days? My opinion is that we should give training in fundamentals which can be taught after the average four years high school course. The college may require many spe-

cial subjects for entrance but in doing so it limits its usefulness. The plea is made that our colleges should have requirements so flexible that the pupil who has done good work in the high school may enter the college on graduation even if college work was not thought of until after graduation. To me the work of the high school should be such that the training in it would fit the graduate for entrance to college, to business or to industry. The age of specialization seems to be crowding out the age of thinking. If it is necessary to have commercial high schools, and manual-training high schools so that the graduates may be self supporting immediately upon graduation, the curriculum of such schools should be so arranged that the necessary mathematics, English, language and science are included and those pursuing such courses can enter our colleges. With specialized college entrance requirements fixing most of the units this would be impossible. Unless the pupil had planned from the beginning to do college work this could not be done if changed conditions made college possible. The engineering school as constituted today stands to receive pupils from a four-year high school course and our requirements should be such that graduates of any good high school can enter regardless of the course they have taken.

The junior college and the acceptance of its work is one of the problems which confronts the engineering schools. The junior college is a development of the last thirty years. This college may take one of many forms. At times it is the name given to the faculty of a university giving the freshman and sophomore years of the present four-year course in which the elementary college mathematics, science, language and history are given and in which the work is preparatory to the work of the university or the professional school. The courses of these years are a continuation of the high school work although done in a more advanced way. The junior college may be a normal school in which work of a college grade is offered in addition to pedagogy. The small denominational college has

been urged to confine its work to the subjects of the freshman and sophomore years on account of its limited funds and to improve what is done so that credit may be given by the larger institution which will then carry on the advanced work of the student. The religious instruction aimed at in these denominational schools can be cared for during the two years of residence. Lastly, the junior colleges may be organized in high schools of large cities where the additional expense may be borne. The junior colleges are formed in accordance with rules formed by state laws or by the State University. The rules fix the kind of subjects to be taught in the two years, the kind of teachers to be employed, the amount of work to be done, the pay of such teachers and the kind of instruction to be given.

The reasons for the formation of the junior college are quite varied. They have been formed because of the difficulty of caring for the large enrollments of freshmen and sophomores in some universities. The collegiate preparation for the professional schools has called for two years of work and this can be cared for by these colleges. The junior college in the high school has been demanded by the desire for further education of the pupils, in order to give vocational and finishing courses to those not intending to go to the university, on account of the desire of many parents to keep their children at or near home until more mature, and lastly for financial reasons. The private junior college is usually a denominational college which has realized its inability to give more than two years of a standard college course with the equipment and funds at its disposal.

These colleges are here to stay and as time progresses many of them will be established. What is to be the attitude of the engineering colleges?

The desire of the college of engineering to give the elementary courses of the freshman and sophomore years rests primarily on the feeling that the work in the secondary schools is not done in a thorough manner. Were thorough work done

these courses could be given in the junior college. So much depends on the preliminary work in mathematics, physics and chemistry that the lack of thorough training handicaps the student. That the work could be done no one can gainsay.

The junior college with its two year course of general cultural subjects combined with the preparatory course in mathematics, physics and chemistry would be an excellent preparation for the engineering college but on account of the technical work which occurs in the first two years of most engineering curricula the student trained at the junior college can not enter the junior year. These technical subjects do not belong to the junior college nor should they be allowed there. To teach them would be to limit the true purpose of the junior college. This means then that the graduates of the junior college, the Associates in Arts or Science as they are called, require three years to finish the engineering course which is planned to be finished in four years by graduates of the high school. Moreover the first year in residence by the Associates will be a year of mixed work as they are prepared to take subjects of the Junior year of the college and must take some work from the freshman and sophomore years. The arrangement of a special curriculum for them would not be advisable until the number of such men coming to our colleges is greatly increased.

This brings up the question of the five-year course in engineering in which the extra year would be filled with subjects of general science, literature and business methods. A course in languages, including English, mathematics including the calculus, elementary college chemistry, elementary college physics, business law and elementary economics covering two years of a five-year course, where manner more than matter was the prevailing consideration, would give an excellent preparation for the technical and professional work of three years to follow. It would also allow the Associate in Arts or Science to enter the work with juniors of the engineering school and thus proceed with men of the same high school class. The re-

quirement of training in certain subjects mathematics, physics and chemistry should be the same for all graduates of the junior college.

Until all colleges of engineering adopt the five-year course this plan would not be advisable, but it may be that in the immediate years before us the junior college will so develop that the equivalent of the five-year course will come of itself from the large number of associates doing three years of work in the engineering school. It does not seem possible that the engineering curriculum can be changed to permit less than three years for such persons. The endeavor should be made to plan these three years with the minimum of change in the regular course to make a balanced three-years course which would satisfy and attract the associate. Such associates should bring to the college more mature minds and the studies should be grasped more readily and appreciated more fully. They would also bring a culture to the profession for which the need is great. For such the engineering school would be similar to the other professional schools in the requirements of college work for entrance.

The last consideration is the coöperation between the colleges and the consumers of our product: the industries and commerce. Not only do the engineering graduates go into the industries but there is a great demand for men with this training, by sales departments and for the managerial positions of various organizations. What do we owe to those who use our graduates?

In the first place a more complete training in the application of theoretical subjects is needed. Our men should have the theory of thermodynamics but more particularly they should know how to use entropy and variable specific heats; they should know that there is the theorem of three moments but what is more important they should know how to use it and when to use it. In addition to knowing these things and their application we should train them to think. As in the secondary school I feel that we may be criticised in not requir-

ing more thought in our work. We are anxious to cover ground and in our endeavor for this we often diminish the amount of thought training. Finally we should train judgment by selecting problems in which this plays an important part. The results of these problems should be discussed before the class and in this way those deficient in good judgment may receive encouragement and guidance.

The colleges ask the coöperation of industry and commerce in demanding from us only that which we should give and are prepared to give, thinking men of good judgment and confidence, without asking for men prepared for the special activities required in a particular industry. In some cases industry is asking for special courses dealing with a special field. Such things are good as far as they go but in preparing for them the student is deprived of more general courses and the industry is getting a man, assuming he enters this field, who is more productive in the first six months or a year but who would fall behind the broadly trained man after this introductory period.

Industry and commerce should realize that the greatest good comes from breadth of training in the college and special training during the first year or two in the industry. My belief is well illustrated by the way in which the Westinghouse Company and other large electric companies have established the so-called "Test Course" to train men for their own line of work. A representative of the American Telephone and Telegraph Company in applying for men for their plant work stated that what they wanted were men trained to think and reason and that civil engineering or mechanical engineering graduates would suit them as well as men from the electrical course if these were trained men who had acquired that for which the college was instituted. The industries must train men in the minutiæ of their practice. The college should give the basic things of all later engineering work. Our colleges differ in plans of study, some have coöperative courses, some have little or no shop work, yet fundamentally all are

working to train students to apply natural laws for the benefit of man and although their graduates start with various handicaps depending on the course they have taken, in a few years these handicaps are overcome and the men are more nearly on the same plane; the thinker, by what ever college course he was trained, at the top. If industry could coöperate in realizing the true function of the college and be willing to do its part in the plan of fitting men to its needs greater things could be accomplished.

The thorough training in the general work of engineering fulfils another requirement of engineering education, that is the preparation of the student for any portion of his field of engineering which may open to him. The preparation for a particular line of work after graduation so often is of little value because of the change in circumstances which renders this line impossible and the graduate must seek another field. A limited man should never be produced. Specialization should come after graduation. The thought of a limited technical school course is open to the same objections which were made to the limited high school course. Our men should be thoroughly grounded in the essentials of engineering. You will pardon my quotation of the motto of Rensselaer, "Knowledge and Thoroughness." This should be our guide in all work.

To summarize the above: coöperation between the schools and colleges is to be obtained by more intensive and thorough work in the preparatory subjects of mathematics, English and the sciences taught in the school, and an acceptance of this work by the colleges so that the average high school can send its graduates to the college without conditions. This latter may mean to some a rearrangement of curricula and this should be done so that graduates from any department of the high school could enter the engineering college. Between the college and industry coöperation will consist in more thorough and intense training by the college in general subjects, the industries assuming the special training required

for their peculiar problems. The preparatory school, the college and industry or commerce should realize the limitations, the scope and the requirements of the activities of each other in a broad way and aid in accepting these for their own guidance.

MINUTES OF THE TWENTY-EIGHTH ANNUAL MEETING.

THE UNIVERSITY OF MICHIGAN, ANN ARBOR.

JUNE 29–JULY 2, 1920.

The twenty-eighth annual meeting of the Society for the Promotion of Engineering Education was held at the University of Michigan, Ann Arbor, Mich., June 29 to July 2, 1920. The sessions were held in the new Engineering Building. There were 229 in attendance.

MINUTES OF THE REGULAR SESSIONS.

TUESDAY, JUNE 29.

Opening Session.

The meeting was called to order at 2:00 P.M. by J. Raleigh Nelson, Associate Professor of English in the Colleges of Engineering and Architecture, University of Michigan, who introduced Harry Burns Hutchins, President of the University. President Hutchins welcomed the Society to the University. Professor Nelson then turned the meeting over to President Arthur M. Greene, Jr., who responded for the Society. The keynote of the meeting was coöperation.

Roy D. Chapin, President of the Hudson Motor Car Company, read a paper on "Coöperation Between Industry and Education." This was followed by Dr. S. P. Capen, of the American Council on Education, who read a paper on the same subject. Mr. Chapin gave the industrial side of the

question, while Dr. Capen presented it from the viewpoint of the educator. A discussion of both papers followed. Dean J. R. Allen gave a short address on the work of the Society of Heating and Ventilating Engineers.

The President announced the following as members of the Committee on Resolutions: W. S. Rodman, *Chairman*, G. A. Goodenough and B. F. Raber.

WEDNESDAY, JUNE 30.

Second Session.

The meeting was called to order at 9:00 A.M. with President Greene in the chair. The report of Committee No. 21 to coöperate with the War Department was read. Charles S. Howe, president of Case School of Applied Science, and chairman of the committee appointed to make a study of engineering stations, then took the chair and the meeting was turned over to a discussion of this matter. It was moved, seconded and carried "That it is the sense and opinion of this meeting, that there is great need for engineering experimentation and research and that we favor federal and state aid for experimentation and research."

President Ira N. Hollis presented a paper on "Coöperation of the Engineering Societies with the Engineering Schools." Discussion.

Third Session.

President Greene called the meeting to order at 2:30 P.M. Dean M. E. Cooley gave a short address on the "Curriculum at the University of Michigan." President C. L. Mees, chairman of the Committee No. 23 to Coöperate with the American Society of Mechanical Engineers read the report of that committee. Discussion. Director J. F. Hayford read the following resolution:

"*Resolved*, That the Executive Committee of the National Advisory Committee for Aeronautics be instructed to undertake, insofar as may be found practicable, the coördination

of air dynamic research work in the educational institutions of the country where are located air-dynamic laboratories, to the end that greater general efficiency in carrying out such work among the scattered research units may be realized, unnecessary duplication of effort avoided, and in order that the work in these various research laboratories may be carried forward together with similar working of the government laboratories, as intelligently related part of a general research program."

Vice-President A. A. Potter presented the report of Committee No. 7, Institutional. Professor L. C. Plant read the report of Committee No. 10, Mathematics. Professor E. C. Kiefer read a paper, "Courses in Engineering Problems," and Professor E. F. Coddington read "Correlation of the Army Intelligence Tests with Academic Work of our First-Year Students." Discussion. In the absence of the Chairman, Professor G. W. Stewart, Dean W. G. Raymond presented the report of Committee No. 11-A, Physics, and Professor O. H. Basquin presented the report of Committee No. 13, Mechanics and Hydraulics. Dean P. F. Walker read the report of Committee No. 14, Economics, in the absence of the chairman, Professor C. C. Williams. The report of Committee No. 11-B, Chemistry, was read by title.

THURSDAY, JULY 1.

Fourth Session.

President Greene called the meeting to order at 9:30 A.M. and invited Vice-President Potter to take the chair. Professor F. H. Newell read a paper on "Pay of Engineering Educators." Discussion. Mr. C. S. Coler presented a paper on "Relation between Technical Schools and Industry" and Mr. H. B. Shaw a paper on "Coöperation of Public Utilities." The Secretary reported the action of Council, namely, that the next meeting of the Society be held at Yale University beginning June 28, 1921. Upon motion the Society voted to accept this recommendation. The Nominating Committee reported as follows:

For officers to serve one year:

For President: M. E. Cooley, University of Michigan.

For Vice-Presidents: T. U. Taylor, University of Texas, H. S. Evans, University of Colorado.

For Secretary: F. L. Bishop, University of Pittsburgh.

For Treasurer: W. O. Wiley, New York City.

For members of the Council to serve for three years: J. F. Merrill, University of Utah; J. H. Felgar, University of Oklahoma; W. H. Timbie, Massachusetts Institute of Technology; L. L. Thurstone, Carnegie Institute of Technology; R. S. King, Georgia School of Technology; C. C. Williams, University of Kansas; J. C. Tracy, Yale University.

Dr. A. L. Williston proposed the following resolution which upon motion was accepted:

"*Resolved,* That it is the sense of this meeting of the Society for the Promotion of Engineering Education that the Committee on Engineering Experimentation proceed with its study of plans for the furtherance of Engineering Investigation and Research, and that it endeavor to harmonize the differences of the existing plans for this purpose, if possible, or if this be found impracticable, that it recommend some plan of its own for consideration of this Society at a future meeting."

Dr. L. L. Thurstone, Chairman of Committee No. 22, Intelligence Tests presented the report of that committee. Professor J. F. Shepard read a paper on the "Rating System for Faculty at the University of Michigan." Discussion.

Fifth Session.

The meeting was called to order by President Greene at 2:00 P.M. In the absence of Professor A. E. Kennelly, Chairman of the Committee on Degrees, Professor F. W. Sperr presented the report of that committee. Professor E. H. Rockwell read Dean G. C. Anthony's paper on "Interdepartmental Coördination."

President Greene appointed President Ira N. Hollis, as a classmate of the President-Elect at the Naval Academy, and

President F. W. McNair, Senior Past-President of the Society in attendance at the meeting, to escort President Cooley to the chair. In presenting the President-Elect to President Greene, President Hollis said: "Mr. President we have the honor of presenting to you your successor in office. Having been duly elected president of this Society, I am sure by his skill in navigating through treacherous channels, he will prove an honor to the profession and this Society." President Greene then introduced the new president to the Society and he accepted the office with a few remarks.

Professor C. W. Park, Chairman of Committee No. 12, English, presented part of the report of that committee, and Miss Sada A. Harbarger, a member of the Committee, reported on the other part.

The Treasurer, Mr. Wiley, presented his report for the year 1919–20 and recommended that each member be assessed $1.00 for two years in order that the increased cost of printing may be met. The Society voted to accept this recommendation and to levy the assessment.

Professor A. E. White read his paper on "Department of Engineering Research, University of Michigan," and Professor W. H. Timbie presented "Coöperative System of Electrical Engineering Department, Massachusetts Institute of Technology." Professor A. N. Talbot discussed the Society's work at the U. S. Naval Academy. Professor A. H. Fuller, Chairman of Committee No. 15, Civil Engineering, presented the report of that committee. Discussion. Professor A. H. Blanchard presented a paper on "Highway and Highway Transport Education." In the absence of the Chairman, C. Francis Harding, Dean O. J. Ferguson read the report of Committee No. 17, Electrical Engineering. Professor F. W. Sperr presented the report of Committee No. 18, Mining Engineering.

Annual Dinner.

At the annual dinner President Greene read his presidential address, "Requirements: Coöperation between Pre-

paratory Schools, Colleges and the Industries as Viewed from the Standpoint of the Educator." Dr. Marion LeRoy Burton having just assumed his office that day, as President of the University of Michigan, the Society presented him with a basket of flowers. President Burton responded to this with an address.

The Committee on Resolutions reported as follows:

Resolved, That it is the sense of this meeting of the Society for the Promotion of Engineering Education that the Committee on Engineering Experimentation proceed with its study of plans for the furtherance of Engineering Investigation and Research, and that it endeavor to harmonize the differences of the existing plans for this purpose, if possible, or if this be found impracticable, that it recommend some plan of its own for consideration of this Society at a future meeting.

The Society for the Promotion of Engineering Education deeply appreciates the many courtesies extended by the officials and members of the faculty of the University of Michigan and others who have been instrumental in making the convention of nineteen twenty so pleasant and profitable. Therefore be it

Resolved, That the thanks of the Society be hereby tendered to the regents of the University, Past-President Hutchins, President Burton, Dean Cooley, Professor Nelson, and other members of the Faculty and Local Committee for the admirable provisions made for the reception and entertainment of its members and guests; to the Michigan Union for the excellent facilities and service so graciously rendered; to the Regents of the University for the very delightful luncheon furnished at Vivian House; to Mrs. G. W. Patterson for her charming hospitality to the ladies at "The Orchards"; to Professor Earl Moore for the arrangement of the organ recital in the Hill Auditorium; and to the fraternities which so kindly opened their houses.

Resolved further, That the thanks of the Society be expressed to the Detroit Edison Company, and particularly to the President, Mr. Alex Dow, for the courtesies extended at Vivian House, and for the opportunity afforded for inspection of the Conners Creek Power Station; to the business men of Ann Arbor for their generous loan of automobiles; to the Hudson Motor Car Company, Morgan and Wright Tire Com-

pany, and Parke Davis and Company for privileges of inspection of their plants; and to the City Engineer of Detroit, Mr. Hubbell, for the cordial arrangements for the tour of the Sewerage System.

WHEREAS, The Council of the Society for the Promotion of Engineering Education has recently voted to present to the Pan-American Union a set of its *Proceedings* and to exchange its publications, and

WHEREAS, By this action it has shown its interest in education throughout the American Republics and its desire to be of service, be it

Resolved, That the members of the Society assembled at the annual convention held at the University of Michigan express their approval of this action, and be it

Resolved, That we express to the educational authorities of the South American Republics our desire to coöperate with them in their engineering educational problems and to be of service in any way, and that we desire to promote the most cordial and friendly relations with them, and be it

Resolved, That we request our members to study the engineering records of these countries to the end that we may be of service when requests come from their governments, and finally be it

Resolved, That these statements be transmitted to the Pan-American Union and to the Bureau of South American Republics of the State Department of the United States for transmission to the proper authorities.

The retiring president, Dr. Harry Burns Hutchins made a few remarks of farewell. President Greene, in a few words, turned the office over to the President-Elect Mortimer E. Cooley who, after ascertaining there was no further business to come before the meeting, declared the convention adjourned.

MINUTES OF COUNCIL MEETINGS HELD JUNE 29 AND JULY 1, 1920.

Meetings of the Council were held on Tuesday, June 29, and Thursday, July 1. Members who attended these meetings are: Frederic Bass, F. L. Bishop, H. S. Boardman, E. F. Coddington, A. M. Greene, Jr., John F. Hayford, C. S. Howe, O. A. Leutwiler, F. W. McNair, W. E. Mott, J. Raleigh

Nelson, W. G. Raymond, W. J. Risley, E. H. Rockwell, W. S. Rodman, C. J. Tilden, and W. O. Wiley.

The motions acted upon were as follows:

1. That the invitation to hold the next meeting of the Society at Yale University be accepted. Carried.

2. That the 1921 meeting at Yale University begin Tuesday, June 28. Carried.

3. That the Treasurer's report be referred to the meeting. Carried.

4. That the recommendation of Mr. Wiley to the effect that each member be assessed $1 for a period of two years in order that the Society may be able to pay up past indebtedness, be increased to $2 for two years. This motion amended that it be $1 for two years. Amendment carried. Motion as amended voted upon and carried.

5. That the next meeting of the Society be held in the winter. Lost.

6. C. J. Tilden was elected to serve for three years on the committee of the American Council on Education.

7. That a complete set of the *Proceedings* be given to the Pan-American Union. Carried.

8. That the Committee on Resolutions draw up and present to the meeting resolutions pertaining to the relations between this country and South American countries.

9. That membership in the John Holmes Safety Association be continued. Carried.

10. That the Society for the Promotion of Engineering Education not take part in the meeting of the American Association for the Advancement of Science. Carried.

11. That the resignations of charter members be not accepted. Carried.

12. That the chairman of each committee be considered as a coöperative editor with the Secretary in editing the bulletin. Carried.

13. That the reports of the Committees on Physics and Mechanics be printed in the *Proceedings* only after further editing. Carried.

14. The following applicants were recommended to the Society for election:

Bragg, Edward M., Cade, Claude M., Dirks, Henry B., French, Robert W., Kiefer, Earl C., Kolyn, Marion D., Jasper, Thomas McL., Peterson, John C., Ward, Clayton N., Wisler, Chester O., University of Porto Rico.

15. The following budget of income and expense for the coming year was reported by the Executive Committee and adopted by the Council:

ESTIMATED RECEIPTS.

From current dues, individual	$6,715.00
From current dues, institutional	710.00
From back dues	800.00
From advertising	1,200.00
From sale of publications	150.00
Estimated receipts	$9,575.00

ESTIMATED EXPENSE.

A. The Michigan meeting (1920)	$ 400.00	
B. *Proceedings*, Vol. 28	1,800.00	
C. ENGINEERING EDUCATION, Vol. XI	2,000.00	
D. Committee Expenses	150.00	
E. Treasurer's honorarium	200.00	
F. Secretary's honorarium	1,000.00	
H. Clerical assistant	1,500.00	
I. Sundry Printing	250.00	
J. Postage and Express	200.00	
K. Telephone and Telegraph	25.00	
L. Office Supplies	75.00	
Estimated expense		$7,600.00

Respectfully submitted,

F. L. BISHOP,
Secretary.

LIST NO. 1 APPLICANTS FOR MEMBERSHIP.

CHILLMAN, EDWARD F., Professor of Descriptive Geometry, Rensselaer Polytechnic Institute, Troy, N. Y. A. M. Greene, G. S. Thompson.

KING, MORLAND, Associate Professor of Electrical Engineering, Lafayette College, Easton, Pa. M. F. Sayre, J. N. Vedder.

COMMITTEES OF THE SOCIETY.

A large part of the work of the Society is conducted by committees under the direction of the Committee on Committees and their work for the year 1920–21 is:

1. Executive Committee: Mortimer E. Cooley, W. O. Wiley, and F. L. Bishop.

2. Publication Committee: Mortimer E. Cooley, W. O. Wiley, and F. L. Bishop.

3. Program Committee: Mortimer E. Cooley, T. U. Taylor, H. S. Evans, W. O. Wiley and F. L. Bishop.

Committees Nos. 1, 2, and 3 have their work defined by the By-Laws of the Society.

4. Committee on Committees: Mortimer E. Cooley, T. U. Taylor, H. S. Evans, W. O. Wiley, C. J. Tilden, H. B. Shaw, and F. L. Bishop.

7. Institutional Committee: T. U. Taylor, Chairman.

To bring the policies of the Society to the attention of the executives and other teachers in their institutions and to represent the Society at the institutions.

8. Committee on Admission: O. J. Ferguson, Chairman, L. L. Thurstone, L. P. Rondinella, and C. E. Magnusson.

Study of the methods of admission to engineering schools including European schools.

9. Committee on Administration: H. S. Evans, Chairman, F. P. McKibben, W. G. Raymond, John T. Faig.

10. Committee on Mathematics: L. C. Plant, Chairman, E. R. Hedrick, and C. E. Comstock.

Coöperate with the National Committee on Mathematical Requirements, under the auspices of the Mathematical Association of America.

11. Chemistry: Joint Committee on Chemistry: R. M. Bird, Chairman.

American Chemical Society: H. P. Talbot, S. W. Parr and R. H. McKee.

Society for the Promotion of Engineering Education: R. M. Bird, J. H. James and J. R. Withrow.

12. Committee on English: C. W. Park, Chairman, J. R. Nelson, Sada Harbarger, and J. R. Macarthur.

Continue the study of the present status of the teaching of English to engineers.

13. Committee on Physics, Mechanics and Hydraulics: W. S. Franklin, Chairman, G. W. Stewart, G. S. Thompson, O. H. Basquin, C. I. Corp, H. H. Higbie, and C. J. Tilden.

14. Committee on Business Training: Morris Knowles, Chairman, A. B. McDaniel, P. F. Walker, W. E. Wickenden, and W. E. Mott.

15. Committee on Civil Engineering: A. H. Blanchard, Chairman, R. H. Hess, W. E. Mott, F. P. Spalding, and H. S. Boardman. Highway engineering.

16. Committee on Mechanical Engineering: John Airey, Chairman, Hugo Diemer, W. W. Carlson, H. Wade Hibbard, and A. Lewis Jenkins. Production engineering.

17. Committee on Electrical Engineering: C. F. Harding, Chairman, O. J. Ferguson, Alexander Gray, H. E. Dyche, F. T. Dargan, E. J. Berg, and H. B. Shaw.

18. Committee on Mining Engineering: F. W. Sperr, Chairman, J. B. Porter, H. H. Stoek.

19. Committee on Drawing: R. S. Kirby, Chairman, T. E. French, W. N. Barnard, and E. C. Chilman.

20. Committee on Standardization of Technical Nomenclature: J. T. Faig, Chairman, W. D. Ennis, F. N. Raymond, Chas. Warren Hunt, and S. E. Moss.

21. Committee on R. O. T. C.: P. F. Walker, Chairman, C. R. Mann, and Anson Marston.

22. Committee on Intelligence Tests: L. L. Thurstone, Chairman, Wm. T. Magruder, Anson Marston, Dugald C. Jackson, and C. R. Dooley.

23. Committee to Coöperate with the American Society of Mechanical Engineers: Ira N. Hollis, Chairman.

24. Committee on Railroad Special Apprenticeship: C. Russ Richards, Chairman, D. D. Ewing, L. S. Randolph, W. D. Pence, and E. E. King.

Present status of railroad special apprenticeship.

THE QUESTION OF ATTENDANCE.

BY EARL D. HAY,

Associate in Mechanical Engineering, University of Illinois.

While the faculties of most of our colleges and universities are pretty well agreed upon what shall be a passing grade in scholarship and how it shall be secured, they are quite widely separated on what shall be a satisfactory attendance record and how it shall be applied to the student's standing in college.

From the information we have received from some of the European universities it seems that the student's scholastic record is their only concern. His attendance in class is a matter which is of interest to the student alone. If he can make a satisfactory record by attending just a few sessions of the class, well and good. If he miscalculates and fails, it is his own fault, and he has himself only to blame for his failure.

In our American universities the opposite condition prevails. The student is forced to attend the class and is held there from the beginning of the semester to its close by a multitude of rules and regulations which, if broken, immediately precipitates him into difficulties which in some cases may easily lead to his dismissal from the college. It seems that some of our colleges even regard the time spent in class as a measure of scholarship in the same way as the time devoted to labor by a workman is a measure of his pay, so many hours, so many dollars. The writer knows of one college in which the per cent. of time lost by the student in a course is deducted from his final scholastic grade in the same way that an absence from work affects the pay envelope of the laborer. This school also counts a tardy mark as equivalent to a half absence.

Have either of these systems, so radically different, reached the desired goal? Are they even leading in the right direction? Shall a university be concerned only with the grades a student makes in his class work? Is this its only responsibility? On the other hand, does a multitude of laws, rules and regulations prevent a student from cutting a class if the opportunity affords?

Several of our universities have rules which allow a student a certain number of cuts from each class without being penalized. The observations of the writer have been that the average student will earnestly endeavor to use up all of his allowable cuts by the end of the semester and will be somewhat disappointed if he has overlooked one such opportunity. He has the notion the university owes him these cutting privileges.

Did the old-time prison discipline reform criminals? Were they converted into honest and upright citizens when the restrictions of prison life were removed and they were turned loose on their own responsibilities? Using the same kind of reasoning, can a student be expected to be punctual and dependable after graduation after having lived under a system of cut rules and forced attendance in college? The writer believes the cut rule is especially bad.

What then is the remedy? Is it not a moral problem and a problem in education? a problem in ideals? Let the college continue the work in moral education begun in the grades. Teach the student to look at the question in a rational manner; to see that the college owes him no cutting privileges; and to see the desirability of forming good habits and arriving at an attitude of mind which unconsciously leads to promptness and reliability.

How many of our teachers or students ever think of the moral problem involved in the administration of our present system of attendance requirements? Most instructors turn in attendance reports in the same perfunctory manner in which they check up equipment in the laboratory or clear off a littered desk, with never a thought of their responsibility in en-

deavoring to improve the attendance record of their classes.

Instead of making absences a matter of discipline by the dean, faculty adviser, or some other officer, why not give a grade in attendance, a thing to be applied to the student's record in a course and as much a part of it as the literal or numerical mark which denotes the scholastic rank in the subject. Such a grade might be made up in many ways, as for example 90–80, *i.e.*, 90 in scholarship, 80 in attendance. This sort of a grade would also give a better idea of the intellectual strength of a student than the scholastic mark alone could give.

Most students would endeavor to be present and on time if they knew how much their attendance record was to affect their collegiate standing. What a help such a record would be to employers who come to the schools to secure graduates to fill positions in their companies! What employer would take a graduate with a good grade in scholarship if his attendance record showed that he had been habitually tardy or absent from his classes? He would at least infer such a student had very low ideals regarding such characteristics as punctuality and dependability.

ROBERT COLLEGE, ENGINEERING SCHOOL.

BY LYNN A. SCIPIO, M.E.

Director.

By far the most valuable asset to the Turkish Empire is her natural resources. Among these we may mention the mines, forests, large areas of fertile soil, lacking water, potential rivers, etc., all waiting for an opportunity to contribute their share to the amelioration and support of the population. It will require a large force of well-trained men to develop these resources and the logical ones to do this are the people of the country with perhaps a guiding hand from friends of other countries, older and better developed.

It was largely the realization of these facts that caused the Trustees to decide to start an engineering school at Robert College. Accordingly in 1910, Professor John R. Allen, of the University of Michigan, was appointed to come to Constantinople, make a study of the situation, plan the school and get it under way. The writer came to the school in 1912 to take up the work, so ably begun by Professor Allen and the same year, the first students (eleven in number) were registered.

The first course of study was of three years duration but at the end of the first year it was decided to make it four years with entrance requirements equivalent to those of the technical schools in the United States and it has continued so from that time until now. We have offered the four courses of electrical, mechanical, civil and mining, the latter being least developed, because of the war conditions. In accordance with the American custom we emphasize the practise work in laboratory to a greater extent than is commonly done in European schools and we require less theory, the result of the combination giving us a well balanced course.

The original plant consists of a substantial four-story stone building 55′ × 117′, together with a large boiler room and power house. This building contains enough modern shop equipment to accommodate 25 to 30 students in the first two years of their course, while for the more advanced students there is electrical, mechanical and civil engineering equipment to demonstrate the more important principles belonging to those branches. There is also in connection with the school a central heating system whereby heat is supplied to all the college buildings, from a central plant, by means of tunnels varying from five to fifteen meters underground. The tunnels also carry hot and cold water pipes and the electric wiring for the various buildings. This system and the one at Constantinople College for Girls are the only examples to be found in the Empire.

During the three or four months before the outbreak of the war orders for laboratory apparatus were placed aggregating some $15,000, but even though the money had been paid in numerous instances, the apparatus could not be delivered and whereby suffered considerable loss. As the war went on and especially after diplomatic relations were broken with the United States we were continually hampered by military interference and in several instances our already scanty supply of machinery was diminished by the process of requisition. Another way in which we were hampered was the lack of teaching force and textbooks. It was necessary to recruit teachers wherever we could find them and all this time the attendance increased. We would naturally have expected a falling off in numbers during these years because students of suitable age were also in their prime for military service. However, many of them escaped it in ways known only to people of this country.

Since the Armistice we have been going through the process of recuperation and are gradually getting back on our feet. During the past summer we expended some $25,000 for laboratory equipment and although shipping facilities have been bad it has been gradually coming and within a few weeks

should all be here. New teachers have been added to the staff and still others will be necessary the coming year.

Fifty-four students are taking the courses in engineering this year while numerous others were refused admission because of lack of accommodation. We are greatly in need of more space, so that it is imperative that we begin building operations very soon if we hope to admit the students who apply next year. Before the war plans were made for the erection of another building which was to house the advanced laboratories. The stone was cut, the steel made up and we now await the opportunity to bring it out from New York and begin the work.

The present floor space devoted to our engineering laboratories is 21,000 square feet, which we intend to increase to 36,000 square feet before another year. When the original plans are completed we will have a large main building with two wings devoted to classrooms and laboratories and aggregating 60,000 square feet of floor space. We will then be prepared to carry on all the lines of experimental and research work found in our modern technical schools in the United States. These will include electrical, mechanical, chemical, physical, hydraulics, material testing, mining and shop laboratories. We are now able to do more or less work along all the above lines excepting mining and we intend to appoint a professor in this subject for the coming year; also to install a mining laboratory. In the future we hope to investigate the sanitary problems and to be of assistance in bringing about better health conditions than have ever existed in and about the city.

An engineering school is an expensive institution to build and maintain, and one of the costly items entering in is equipment. Many American schools have much of their equipment furnished them by manufacturers, either as gifts or loans. These manufacturers appreciate the educational and advertising value of having their product brought before the young men as students who are to recommend the use of, or be the users of machinery after they leave school.

If the above practice is of value in the United States, where there is such a large variety of machinery on the market, and the margin of profit is small, it would be of vastly more value to do the same thing with us, here in a virgin field, where the use of modern machinery is in its infancy. We do not plan to have anything in our laboratories that cannot be used and young engineers are sure to recommend and use machines with which they are familiar when they leave school.

It is our aim to have in our shops and laboratories not only apparatus made in the United States but also representative machines made in England, France, Germany, Switzerland, Italy, etc., thus permitting the students to make comparison of the various types and designs used in modern practice on the two continents. This is an advantage found in very few American institutions and one the value of which should not be lost sight of.

One of the real problems in maintaining an engineering school in Turkey is that of securing a competent teaching staff. The same high principles must actuate a man in causing him to leave his home in the United States and come to a foreign field to take up engineering work, as those which cause him to take up any other line of educational or missionary work. Good technical men can command good salaries and maintain in comfortable homes in the United States. Our missionary and educational institutions cannot afford to pay such salaries and the difference in financial compensation must be made up by furnishing an outlet to a real desire to contribute energy and ability to a great cause, that of the uplift and enlightenment of a needy people.

Within the short life of our engineering school we have been fortunate in securing men who are not only well educated, capable and experienced teachers, but men who have had successful practical experience, are members of national societies and are recognized as able engineers among the members of the profession. We do not care to consider men for positions on our staff whose motives are purely those of adventure or financial compensation.

When we were erecting our first building and equipping our shops it was considered by the people of the country a foolish experiment and a great waste of money, as they said the students here would not soil their clothes and hands by working in the forge, foundry and machine shops. We tried out the experiment, however, and have found that the young men of this country are just as anxious to do the practical things as are boys at home; also, we have found them just about as capable. If one examines the samples of work in the cases at the entrance to our engineering building he will find them of high character, comparing favorably with the work done by our best schools at home. These students are also active and much interested in the advanced work and frequently show a considerable amount of originality. Two of our last year's graduates entered two of the foremost engineering schools in the United States last fall with graduate standing and are candidates for the degrees of Master of Science at the end of the year. This means that they were given the same recognition as if they had graduated from an American institution.

Before war was declared by the United States the engineering field there had become somewhat congested owing to the great number of technical graduates turned out each year, and it was not always easy for young engineers to secure good positions, but it will be several generations before the same thing would happen in Turkey. There are hundreds of mines to develop, thousands of square miles of land to irrigate, many forests to conserve, water power to utilize, harbors to construct and thousands of miles of railway to build. The primary mission of the Robert College Engineering School is to furnish the young men of this country an opportunity to obtain a first class technical education at a very small cost, thus enabling them to become a vital moving force in the future development of the country.

KANSAS–NEBRASKA SECTION.

A meeting of the Kansas-Nebraska Section for the S. P. E. E. was held in connection with the dedication of the Agricultural Engineering Department building at the University Farm Campus, Lincoln.

The branch society met for the first meeting since the organization on the evening of April 14 in one of the rooms of the new agricultural engineering building. The general discussion of engineering education was the program for the evening. Inasmuch as the meeting was entirely informal, no record was made of any of the remarks or suggestions presented. It was felt by everyone present that meetings of this kind should be held more frequently and that the value obtained from comparisons of different institutions is of great value to the teaching profession.

THE REORGANIZATION OF NELA RESEARCH LABORATORIES.

Dr. Ernest Fox Nichols Goes to Nela Park.

Nela Research Laboratory was organized in 1908 under the directorship of Dr. Edward P. Hyde as The Physical Laboratory of the National Electric Lamp Association. The name was changed to Nela Research Laboratory in 1913, when the National Electric Lamp Association became the National Lamp Works of General Electric Company. For some years the Laboratory was devoted exclusively to the development of those sciences on which the art of lighting has its foundation, but in 1914 the functions of the laboratory were extended by the addition of a small Section of Applied Science, which had an immediate practical objective.

The Section of Applied Science is now being largely extended as a separate Laboratory of Applied Science under the immediate direction of Mr. M. Luckiesh, who becomes Director of Applied Science, and a new building is being constructed to house this branch of the work, which will be carried forward with a staff of several physicists, an engineer, an architect and a designer, together with the necessary technical and clerical assistants.

Dr. Ernest Fox Nichols, formerly President of Dartmouth College, and more recently Professor of Physics at Yale University, has accepted an invitation to assume the immediate direction of the Laboratory of Pure Science, under the title of Director of Pure Science. The work of this Laboratory, which will be continued in the present building, will be somewhat further extended under the new organization.

The Laboratory of Pure Science and the Laboratory of Applied Science will together constitute the Nela Research Laboratories, and will be coördinated under the general direction of Dr. Hyde, who becomes Director of Research.